CSE- 1006 LAB Assignment - 1

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Faculty Name: Dr. Arun kumar Gopu **Date:** 11 /3/2022

Student name: M.Taran **Reg. no.:** 19BCE7346

Open Rstudio/R Console

In console, Print the dataset mtcars

data(mtcars)

head(mtcars)

```
> data(mtcars)
> head(mtcars)
                   mpg cyl disp  hp drat
Mazda RX4         21.0   6  160 110 3.90
Mazda RX4 Wag     21.0   6  160 110 3.90
Datsun 710        22.8   4  108  93 3.85
Hornet 4 Drive    21.4   6  258 110 3.08
Hornet Sportabout 18.7   8  360 175 3.15
Valiant           18.1   6  225 105 2.76
                     wt  qsec vs am gear
Mazda RX4         2.620 16.46  0  1    4
Mazda RX4 Wag     2.875 17.02  0  1    4
Datsun 710        2.320 18.61  1  1    4
Hornet 4 Drive    3.215 19.44  1  0    3
Hornet Sportabout 3.440 17.02  0  0    3
Valiant           3.460 20.22  1  0    3
                  carb
Mazda RX4            4
Mazda RX4 Wag        4
Datsun 710           1
Hornet 4 Drive       1
Hornet Sportabout    2
Valiant              1
```

Print the structure of the dataset

summary(mtcars)

```
> summary(mtcars)
      mpg             cyl
 Min.   :10.40   Min.   :4.000
 1st Qu.:15.43   1st Qu.:4.000
 Median :19.20   Median :6.000
 Mean   :20.09   Mean   :6.188
 3rd Qu.:22.80   3rd Qu.:8.000
 Max.   :33.90   Max.   :8.000
      disp             hp
 Min.   : 71.1   Min.   : 52.0
 1st Qu.:120.8   1st Qu.: 96.5
 Median :196.3   Median :123.0
 Mean   :230.7   Mean   :146.7
 3rd Qu.:326.0   3rd Qu.:180.0
 Max.   :472.0   Max.   :335.0
      drat             wt
 Min.   :2.760   Min.   :1.513
 1st Qu.:3.080   1st Qu.:2.581
 Median :3.695   Median :3.325
 Mean   :3.597   Mean   :3.217
 3rd Qu.:3.920   3rd Qu.:3.610
 Max.   :4.930   Max.   :5.424
      qsec             vs
```

What is the datatype of the dataset?

help(mtcars)

```
> str(mtcars)
'data.frame':   32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 2
4.4 22.8 19.2 ...
 $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95
 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21
 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
 $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
```

How many columns and rows are there in the dataset??

dim(mtcars)

names(mtcars)

```
> dim(mtcars)
[1] 32 11
> names(mtcars)
 [1] "mpg"  "cyl"  "disp" "hp"   "drat"
 [6] "wt"   "qsec" "vs"   "am"   "gear"
[11] "carb"
> nrow(mtcars)
[1] 32
> ncol(mtcars)
[1] 11
>
```

What information (structure summary) you will get from the str() function?

str(mtcars)

```
> str(mtcars)
'data.frame':   32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 2
4.4 22.8 19.2 ...
 $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95
 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21
 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
 $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
```

Print the row names

row.names(mtcars)

```
> row.names(mtcars)
 [1] "Mazda RX4"
 [2] "Mazda RX4 Wag"
 [3] "Datsun 710"
 [4] "Hornet 4 Drive"
 [5] "Hornet Sportabout"
 [6] "Valiant"
 [7] "Duster 360"
 [8] "Merc 240D"
 [9] "Merc 230"
[10] "Merc 280"
[11] "Merc 280C"
[12] "Merc 450SE"
[13] "Merc 450SL"
[14] "Merc 450SLC"
[15] "Cadillac Fleetwood"
[16] "Lincoln Continental"
[17] "Chrysler Imperial"
[18] "Fiat 128"
[19] "Honda Civic"
[20] "Toyota Corolla"
[21] "Toyota Corona"
[22] "Dodge Challenger"
[23] "AMC Javelin"
```

Print the column names

colnames(mtcars)

```
> colnames(mtcars)
 [1] "mpg"  "cyl"  "disp" "hp"   "drat"
 [6] "wt"   "qsec" "vs"   "am"   "gear"
[11] "carb"
>
>
```

Print the number of columns in mtcars (Hint: Use function-ncol)

print(ncol(mtcars))

```
>
> print(ncol(mtcars))
[1] 11
>
>
```

Print the number of rows (Hint: Use function-nrow)
print(nrow(mtcars))

```
>
> print(nrow(mtcars))
[1] 32
>
>
```

Print all the elements of 2nd row
mtcars[2,]

```
>
> mtcars[2,]
               mpg cyl disp  hp drat    wt
Mazda RX4 Wag   21   6  160 110  3.9 2.875
                qsec vs am gear carb
Mazda RX4 Wag 17.02  0  1    4    4
>
>
```

Print all the elements of 2nd, 5th and 13th row
temp <- c(2,5,13)
mtcars[temp,]

```
> temp <- c(2,5,13)
> mtcars[temp,]
                   mpg cyl  disp  hp drat
Mazda RX4 Wag     21.0   6 160.0 110 3.90
Hornet Sportabout 18.7   8 360.0 175 3.15
Merc 450SL        17.3   8 275.8 180 3.07
                     wt  qsec vs am gear
Mazda RX4 Wag     2.875 17.02  0  1    4
Hornet Sportabout 3.440 17.02  0  0    3
Merc 450SL        3.730 17.60  0  0    3
                  carb
Mazda RX4 Wag        4
Hornet Sportabout    2
Merc 450SL           3
>
```

Print the elements of rows from 15 to 20
print(mtcars[15:20,])

```
>
> print(mtcars[15:20,])
                     mpg cyl  disp  hp drat
Cadillac Fleetwood  10.4   8 472.0 205 2.93
Lincoln Continental 10.4   8 460.0 215 3.00
Chrysler Imperial   14.7   8 440.0 230 3.23
Fiat 128            32.4   4  78.7  66 4.08
Honda Civic         30.4   4  75.7  52 4.93
Toyota Corolla      33.9   4  71.1  65 4.22
                       wt  qsec vs am gear
Cadillac Fleetwood  5.250 17.98  0  0    3
Lincoln Continental 5.424 17.82  0  0    3
Chrysler Imperial   5.345 17.42  0  0    3
Fiat 128            2.200 19.47  1  1    4
Honda Civic         1.615 18.52  1  1    4
Toyota Corolla      1.835 19.90  1  1    4
                    carb
```

Print the elements of rows from 13 to 24, 28 and 30
temp <- c(13:25,28,30)
mtcars[temp,]

```
> temp <- c(13:25,28,30)
> mtcars[temp,]
                     mpg cyl  disp  hp drat
Merc 450SL          17.3   8 275.8 180 3.07
Merc 450SLC         15.2   8 275.8 180 3.07
Cadillac Fleetwood  10.4   8 472.0 205 2.93
Lincoln Continental 10.4   8 460.0 215 3.00
Chrysler Imperial   14.7   8 440.0 230 3.23
Fiat 128            32.4   4  78.7  66 4.08
Honda Civic         30.4   4  75.7  52 4.93
Toyota Corolla      33.9   4  71.1  65 4.22
Toyota Corona       21.5   4 120.1  97 3.70
Dodge Challenger    15.5   8 318.0 150 2.76
AMC Javelin         15.2   8 304.0 150 3.15
Camaro Z28          13.3   8 350.0 245 3.73
Pontiac Firebird    19.2   8 400.0 175 3.08
Lotus Europa        30.4   4  95.1 113 3.77
Ferrari Dino        19.7   6 145.0 175 3.62
                       wt  qsec vs am gear
Merc 450SL          3.730 17.60  0  0    3
Merc 450SLC         3.780 18.00  0  0    3
Cadillac Fleetwood  5.250 17.98  0  0    3
Lincoln Continental 5.424 17.82  0  0    3
Chrysler Imperial   5.345 17.42  0  0    3
Fiat 128            2.200 19.47  1  1    4
```

Print all odd indexed rows (rows 1,3,5,...) (Hint: Use function - seq)
row <- seq_len(nrow(mtcars)) %% 2
Row

```
>
> row <- seq_len(nrow(mtcars)) %% 2
> row
 [1] 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
> tmp <- mtcars[row == 1, ]
```

tmp <- mtcars[row == 1,]
Tmp

```
> tmp <- mtcars[row == 1, ]
> tmp
                   mpg cyl  disp  hp drat
Mazda RX4         21.0   6 160.0 110 3.90
Datsun 710        22.8   4 108.0  93 3.85
Hornet Sportabout 18.7   8 360.0 175 3.15
Duster 360        14.3   8 360.0 245 3.21
Merc 230          22.8   4 140.8  95 3.92
Merc 280C         17.8   6 167.6 123 3.92
Merc 450SL        17.3   8 275.8 180 3.07
Cadillac Fleetwood 10.4  8 472.0 205 2.93
Chrysler Imperial 14.7   8 440.0 230 3.23
Honda Civic       30.4   4  75.7  52 4.93
Toyota Corona     21.5   4 120.1  97 3.70
AMC Javelin       15.2   8 304.0 150 3.15
Pontiac Firebird  19.2   8 400.0 175 3.08
Porsche 914-2     26.0   4 120.3  91 4.43
Ford Pantera L    15.8   8 351.0 264 4.22
Maserati Bora     15.0   8 301.0 335 3.54
```

Print all even indexed rows (rows 2,4,6,...)

tmp <- mtcars[row == 0,]

tmp

```
> tmp <- mtcars[row == 0, ]
> tmp
                   mpg cyl  disp  hp drat
Mazda RX4 Wag     21.0   6 160.0 110 3.90
Hornet 4 Drive    21.4   6 258.0 110 3.08
Valiant           18.1   6 225.0 105 2.76
Merc 240D         24.4   4 146.7  62 3.69
Merc 280          19.2   6 167.6 123 3.92
Merc 450SE        16.4   8 275.8 180 3.07
Merc 450SLC       15.2   8 275.8 180 3.07
Lincoln Continental 10.4 8 460.0 215 3.00
Fiat 128          32.4   4  78.7  66 4.08
Toyota Corolla    33.9   4  71.1  65 4.22
Dodge Challenger  15.5   8 318.0 150 2.76
Camaro Z28        13.3   8 350.0 245 3.73
```

Print every 3rd row from 1st row (1,4,7,10..)

rd <- seq_len(nrow(mtcars)) %% 3

tmp <- mtcars[rd == 1,]

rd

```
>
> rd <- seq_len(nrow(mtcars)) %% 3
> tmp <- mtcars[rd == 1, ]
> rd
 [1] 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2
[21] 0 1 2 0 1 2 0 1 2 0 1 2
>
>
```

Print first row and last row (Hint: Use function - ncol)

mtcars[1,]

mtcars[32,]

```
> mtcars[1,]
          mpg cyl disp  hp drat   wt  qsec
Mazda RX4  21   6  160 110  3.9 2.62 16.46
          vs am gear carb
Mazda RX4  0  1    4    4
> mtcars[32,]
           mpg cyl disp  hp drat   wt qsec
Volvo 142E 21.4   4  121 109 4.11 2.78 18.6
           vs am gear carb
Volvo 142E  1  1    4    2
>
```

Print last 3 rows without using tail() function

tail(mtcars,3)

```
> tail(mtcars,3)
              mpg cyl disp  hp drat   wt
Ferrari Dino  19.7   6  145 175 3.62 2.77
Maserati Bora 15.0   8  301 335 3.54 3.57
Volvo 142E    21.4   4  121 109 4.11 2.78
              qsec vs am gear carb
Ferrari Dino  15.5  0  1    5    6
Maserati Bora 14.6  0  1    5    8
Volvo 142E    18.6  1  1    4    2
>
```

Print the elements of 3rd column

mtcars[,3]

```
> mtcars[,3]
 [1] 160.0 160.0 108.0 258.0 360.0 225.0
 [7] 360.0 146.7 140.8 167.6 167.6 275.8
[13] 275.8 275.8 472.0 460.0 440.0  78.7
[19]  75.7  71.1 120.1 318.0 304.0 350.0
[25] 400.0  79.0 120.3  95.1 351.0 145.0
[31] 301.0 121.0
>
>
```

Print the elements of column with name "wt"

mtcars[“wt”]

```
> mtcars["wt"]
                     wt
Mazda RX4           2.620
Mazda RX4 Wag       2.875
Datsun 710          2.320
Hornet 4 Drive      3.215
Hornet Sportabout   3.440
Valiant             3.460
Duster 360          3.570
Merc 240D           3.190
Merc 230            3.150
Merc 280            3.440
Merc 280C           3.440
Merc 450SE          4.070
Merc 450SL          3.730
Merc 450SLC         3.780
Cadillac Fleetwood  5.250
Lincoln Continental 5.424
```

Print the elements of columns "mpg" and "qsec"

a<-c(“mpg”,”qsec”)

mtcars[a]

```
> a<-c("mpg","qsec")
> mtcars[a]
                     mpg  qsec
Mazda RX4           21.0 16.46
Mazda RX4 Wag       21.0 17.02
Datsun 710          22.8 18.61
Hornet 4 Drive      21.4 19.44
Hornet Sportabout   18.7 17.02
Valiant             18.1 20.22
Duster 360          14.3 15.84
Merc 240D           24.4 20.00
Merc 230            22.8 22.90
Merc 280            19.2 18.30
Merc 280C           17.8 18.90
Merc 450SE          16.4 17.40
Merc 450SL          17.3 17.60
Merc 450SLC         15.2 18.00
```

Print first three columns

mtcars[,1:3]

```
> mtcars[,1:3]
                     mpg cyl  disp
Mazda RX4           21.0   6 160.0
Mazda RX4 Wag       21.0   6 160.0
Datsun 710          22.8   4 108.0
Hornet 4 Drive      21.4   6 258.0
Hornet Sportabout   18.7   8 360.0
Valiant             18.1   6 225.0
Duster 360          14.3   8 360.0
Merc 240D           24.4   4 146.7
Merc 230            22.8   4 140.8
Merc 280            19.2   6 167.6
Merc 280C           17.8   6 167.6
Merc 450SE          16.4   8 275.8
Merc 450SL          17.3   8 275.8
Merc 450SLC         15.2   8 275.8
Cadillac Fleetwood  10.4   8 472.0
Lincoln Continental 10.4   8 460.0
```

Print the elements of columns from 5 to 10

mtcars[,5:10]

```
> mtcars[,5:10]
                    drat    wt  qsec vs am gear
Mazda RX4           3.90 2.620 16.46  0  1    4
Mazda RX4 Wag       3.90 2.875 17.02  0  1    4
Datsun 710          3.85 2.320 18.61  1  1    4
Hornet 4 Drive      3.08 3.215 19.44  1  0    3
Hornet Sportabout   3.15 3.440 17.02  0  0    3
Valiant             2.76 3.460 20.22  1  0    3
Duster 360          3.21 3.570 15.84  0  0    3
Merc 240D           3.69 3.190 20.00  1  0    4
Merc 230            3.92 3.150 22.90  1  0    4
Merc 280            3.92 3.440 18.30  1  0    4
Merc 280C           3.92 3.440 18.90  1  0    4
Merc 450SE          3.07 4.070 17.40  0  0    3
Merc 450SL          3.07 3.730 17.60  0  0    3
Merc 450SLC         3.07 3.780 18.00  0  0    3
Cadillac Fleetwood  2.93 5.250 17.98  0  0    3
Lincoln Continental 3.00 5.424 17.82  0  0    3
Chrysler Imperial   3.23 5.345 17.42  0  0    3
Fiat 128            4.08 2.200 19.47  1  1    4
Honda Civic         4.93 1.615 18.52  1  1    4
Toyota Corolla      4.22 1.835 19.90  1  1    4
```

Print the elements of columns from 3 to 7, 9 and 11

a<-c(3:7,9,11)

mtcars[,a]

```
> a<-c(3:7,9,11)
> mtcars[,a]
                   disp  hp drat    wt  qsec am carb
Mazda RX4         160.0 110 3.90 2.620 16.46  1    4
Mazda RX4 Wag     160.0 110 3.90 2.875 17.02  1    4
Datsun 710        108.0  93 3.85 2.320 18.61  1    1
Hornet 4 Drive    258.0 110 3.08 3.215 19.44  0    1
Hornet Sportabout 360.0 175 3.15 3.440 17.02  0    2
Valiant           225.0 105 2.76 3.460 20.22  0    1
Duster 360        360.0 245 3.21 3.570 15.84  0    4
Merc 240D         146.7  62 3.69 3.190 20.00  0    2
Merc 230          140.8  95 3.92 3.150 22.90  0    2
Merc 280          167.6 123 3.92 3.440 18.30  0    4
Merc 280C         167.6 123 3.92 3.440 18.90  0    4
Merc 450SE        275.8 180 3.07 4.070 17.40  0    3
Merc 450SL        275.8 180 3.07 3.730 17.60  0    3
Merc 450SLC       275.8 180 3.07 3.780 18.00  0    3
Cadillac Fleetwood  472.0 205 2.93 5.250 17.98  0    4
Lincoln Continental 460.0 215 3.00 5.424 17.82  0    4
Chrysler Imperial   440.0 230 3.23 5.345 17.42  0    4
Fiat 128           78.7  66 4.08 2.200 19.47  1    1
Honda Civic        75.7  52 4.93 1.615 18.52  1    2
Toyota Corolla     71.1  65 4.22 1.835 19.90  1    1
Toyota Corona      120.1  97 3.70 2.465 20.01  0    1
```

Print all odd indexed columns (1,3,5,...)

```
col_odd <- seq_len(ncol(mtcars)) %% 2
col_odd
d_c_a <- mtcars[,col_odd == 1]
d_c_a
```

```
> col_odd <- seq_len(ncol(mtcars)) %% 2
> col_odd
 [1] 1 0 1 0 1 0 1 0 1 0 1
> data_col_odd <- mtcars[,col_odd == 1]
> data_col_odd
                   mpg  disp drat  qsec am carb
Mazda RX4         21.0 160.0 3.90 16.46  1    4
Mazda RX4 Wag     21.0 160.0 3.90 17.02  1    4
Datsun 710        22.8 108.0 3.85 18.61  1    1
Hornet 4 Drive    21.4 258.0 3.08 19.44  0    1
Hornet Sportabout 18.7 360.0 3.15 17.02  0    2
Valiant           18.1 225.0 2.76 20.22  0    1
Duster 360        14.3 360.0 3.21 15.84  0    4
Merc 240D         24.4 146.7 3.69 20.00  0    2
Merc 230          22.8 140.8 3.92 22.90  0    2
Merc 280          19.2 167.6 3.92 18.30  0    4
Merc 280C         17.8 167.6 3.92 18.90  0    4
Merc 450SE        16.4 275.8 3.07 17.40  0    3
Merc 450SL        17.3 275.8 3.07 17.60  0    3
Merc 450SLC       15.2 275.8 3.07 18.00  0    3
Cadillac Fleetwood  10.4 472.0 2.93 17.98  0    4
Lincoln Continental 10.4 460.0 3.00 17.82  0    4
Chrysler Imperial   14.7 440.0 3.23 17.42  0    4
Fiat 128          32.4  78.7 4.08 19.47  1    1
Honda Civic       30.4  75.7 4.93 18.52  1    2
Toyota Corolla    33.9  71.1 4.22 19.90  1    1
```

Print all even indexed columns (2,4,6,...)

```
rd <-  mtcars[row == 0, ]
rd
```

```
> data_col_even <- mtcars[,col_odd == 0]
> data_col_even
                  cyl  hp    wt vs gear
Mazda RX4           6 110 2.620  0    4
Mazda RX4 Wag       6 110 2.875  0    4
Datsun 710          4  93 2.320  1    4
Hornet 4 Drive      6 110 3.215  1    3
Hornet Sportabout   8 175 3.440  0    3
Valiant             6 105 3.460  1    3
Duster 360          8 245 3.570  0    3
Merc 240D           4  62 3.190  1    4
Merc 230            4  95 3.150  1    4
Merc 280            6 123 3.440  1    4
Merc 280C           6 123 3.440  1    4
Merc 450SE          8 180 4.070  0    3
Merc 450SL          8 180 3.730  0    3
Merc 450SLC         8 180 3.780  0    3
Cadillac Fleetwood  8 205 5.250  0    3
```

Print every 3rd column from the 1st column (1,4,7,10..)

```
> col3 <- seq_len(ncol(mtcars)) %% 3
> col3
 [1] 1 2 0 1 2 0 1 2 0 1 2
> data_col_three <- mtcars[,col3== 1]
> data_col_three
                   mpg  hp  qsec gear
Mazda RX4         21.0 110 16.46    4
Mazda RX4 Wag     21.0 110 17.02    4
Datsun 710        22.8  93 18.61    4
Hornet 4 Drive    21.4 110 19.44    3
Hornet Sportabout 18.7 175 17.02    3
Valiant           18.1 105 20.22    3
Duster 360        14.3 245 15.84    3
Merc 240D         24.4  62 20.00    4
Merc 230          22.8  95 22.90    4
Merc 280          19.2 123 18.30    4
Merc 280C         17.8 123 18.90    4
Merc 450SE        16.4 180 17.40    3
Merc 450SL        17.3 180 17.60    3
Merc 450SLC       15.2 180 18.00    3
Cadillac Fleetwood  10.4 205 17.98    3
Lincoln Continental 10.4 215 17.82    3
Chrysler Imperial   14.7 230 17.42    3
Fiat 128          32.4  66 19.47    4
Honda Civic       30.4  52 18.52    4
```

Print first column and last column

```
> total<-ncol(mtcars)
> total
[1] 11
> a<-c(1,total)
> mtcars[,a]
                   mpg carb
Mazda RX4         21.0    4
Mazda RX4 Wag     21.0    4
Datsun 710        22.8    1
Hornet 4 Drive    21.4    1
Hornet Sportabout 18.7    2
Valiant           18.1    1
Duster 360        14.3    4
Merc 240D         24.4    2
Merc 230          22.8    2
Merc 280          19.2    4
Merc 280C         17.8    4
Merc 450SE        16.4    3
Merc 450SL        17.3    3
Merc 450SLC       15.2    3
Cadillac Fleetwood 10.4   4
```

Print last 3 columns

```
> total<-ncol(mtcars)
> total3<-ncol(mtcars)-2
> mtcars[,total3:total]
                  am gear carb
Mazda RX4          1    4    4
Mazda RX4 Wag      1    4    4
Datsun 710         1    4    1
Hornet 4 Drive     0    3    1
Hornet Sportabout  0    3    2
Valiant            0    3    1
Duster 360         0    3    4
Merc 240D          0    4    2
Merc 230           0    4    2
Merc 280           0    4    4
Merc 280C          0    4    4
Merc 450SE         0    3    3
Merc 450SL         0    3    3
Merc 450SLC        0    3    3
Cadillac Fleetwood 0    3    4
Lincoln Continental 0   3    4
Chrysler Imperial  0    3    4
Fiat 128           1    4    1
Honda Civic        1    4    2
Toyota Corolla     1    4    1
Toyota Corona      0    3    1
```

Print first Row and 2nd and third column

```
> a<-c(1)
> b<-c(2,3)
> mtcars[a,b]
          cyl disp
Mazda RX4   6  160
```

Print First, Second Row and Second and Third Column

a <- c(1)

b <- c(2,4,6)

mtcars[a,b]

```
> a <- c(1)
> b <- c(2,4,6)
> mtcars[a,b]
          cyl  hp   wt
Mazda RX4   6 110 2.62
```

Print element at 2nd row, third column

mtcars[2,3]

```
> mtcars[2,3]
[1] 160
```

Print all the rows having "mpg" value greater than 14

mtcars %>% filter(mpg> 14)

Print all the rows having "hp" value less than 100

mtcars %>% filter(hp < 100)

Print all the rows having "disp" value is between 100 and 200

mtcars %>% filter(100 < disp & disp < 200)

ATTACH & DETACH FUNCTIONS

---

find what attach() and detach() commands do???

attach() function in R Language is used to access the variables present in the data framework without calling the data frame.

detach() function is used to remove the attachment in the data framework that was made by attach() function.

The detach function can be used to: **Remove the attachment of a data. frame, which was previously attached with the attach function.**

HEAD & TAIL FUNCTIONS

---

find what head() and tail() commands do

Use head() and tail() commands to display sample observations of mtcars dataset

head(mtcars)

```
> head(mtcars)
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

tail(mtcars)

```
> tail(mtcars)
                  mpg cyl  disp  hp drat    wt qsec vs am gear carb
Porsche 914-2    26.0   4 120.3  91 4.43 2.140 16.7  0  1    5    2
Lotus Europa     30.4   4  95.1 113 3.77 1.513 16.9  1  1    5    2
Ford Pantera L   15.8   8 351.0 264 4.22 3.170 14.5  0  1    5    4
Ferrari Dino     19.7   6 145.0 175 3.62 2.770 15.5  0  1    5    6
Maserati Bora    15.0   8 301.0 335 3.54 3.570 14.6  0  1    5    8
Volvo 142E       21.4   4 121.0 109 4.11 2.780 18.6  1  1    4    2
```

Use head() command to Print first 10 observations

head(mtcars, 10)

```
> head(mtcars, 10)
                   mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Duster 360        14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Merc 240D         24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
Merc 230          22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
Merc 280          19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
```

Use tail() commands to Print last 15 observations

tail(mtcars, 15)

```
> tail(mtcars, 15)
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Fiat 128         32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
Honda Civic      30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
Toyota Corolla   33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
Toyota Corona    21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
Dodge Challenger 15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
AMC Javelin      15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Camaro Z28       13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Pontiac Firebird 19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
Fiat X1-9        27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Porsche 914-2    26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
Lotus Europa     30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
Ford Pantera L   15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Ferrari Dino     19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
Maserati Bora    15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Volvo 142E       21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

SORTING

Sort the observations of dataset "mtcars" in increasing order based on the values in the column "mpg"

attach(mtcars)

newdata <- mtcars[order(mpg),]

detach(mtcars)

Newdata

```
> attach(mtcars)
> newdata <- mtcars[order(mpg),]
> detach(mtcars)
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
```

Sort the observations of dataset "mtcars" in decreasing order based on the values in the column "cyl"

newdata <- mtcars[order(-mtcars$cyl),]

newdata

```
> newdata <- mtcars[order(-mtcars$cyl),]
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Hornet Sportabout  18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Duster 360         14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Merc 450SE         16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL         17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 450SLC        15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
Cadillac Fleetwood 10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4  8 460.0 215 3.00 5.424 17.82  0  0    3    4
Chrysler Imperial  14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Dodge Challenger   15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
AMC Javelin        15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Camaro Z28         13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Pontiac Firebird   19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
Ford Pantera L     15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Maserati Bora      15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Mazda RX4          21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
```

Sort the observations of dataset "mtcars" in increasing order based on the values in the columns both "mpg" and "cyl"

newdata <- mtcars[order(mtcars$mpg, mtcars$cyl),]

newdata

```
> newdata <- mtcars[order(mtcars$mpg,mtcars$cyl),]
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
```

Sort the observations of dataset "mtcars" in decreasing order based on the values in the columns both "mpg" and "cyl".

newdata <- mtcars[order(cyl, mpg),]

Newdata

```
> attach(mtcars)
> newdata <- mtcars[order(mpg),]
> detach(mtcars)
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
Mazda RX4           21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
Datsun 710          22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
Merc 230            22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
Merc 240D           24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Honda Civic         30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
Fiat 128            32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
```

```
> newdata <- mtcars[order(cyl,mpg),]
> newdata
                     mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
Datsun 710          22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
Merc 230            22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
Merc 240D           24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Honda Civic         30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
Fiat 128            32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
Mazda RX4           21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
>
```

Sort the observations of the dataset "mtcars" by column "mpg" in increasing order and column "cyl" in decreasing order

```
newdata <- mtcars[order(mpg, -cyl),]
newdata
```

```
> newdata <- mtcars[order(mtcars$mpg, -mtcars$cyl),]
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1

> newdata <- mtcars[order(-cyl),]
> newdata
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Hornet Sportabout  18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Duster 360         14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Merc 450SE         16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL         17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 450SLC        15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
Cadillac Fleetwood 10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4  8 460.0 215 3.00 5.424 17.82  0  0    3    4
Chrysler Imperial  14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Dodge Challenger   15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
AMC Javelin        15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Camaro Z28         13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Pontiac Firebird   19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
Ford Pantera L     15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Maserati Bora      15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Mazda RX4          21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag      21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
Hornet 4 Drive     21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
Valiant            18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Merc 280           19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
Merc 280C          17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Ferrari Dino       19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
Datsun 710         22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
Merc 240D          24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
Merc 230           22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
Fiat 128           32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
Honda Civic        30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
Toyota Corolla     33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
Toyota Corona      21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
Fiat X1-9          27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Porsche 914-2      26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
Lotus Europa       30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
Volvo 142E         21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

newdata <- mtcars[orders(mpg, -cyl),]

newdata

```
> newdata <- mtcars[order(mtcars$mpg, -mtcars$cyl),]
> newdata
                     mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
> newdata <- mtcars[order(mpg, -cyl),]
> newdata
                     mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
Mazda RX4           21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
Datsun 710          22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
Merc 230            22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
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